Understanding Exposure

Danny Foley

Topics

- Human Sight Vs Camera Sensor
- Aperture and Shutter Speed
- Metering and Exposure
- Camera Meter Modes
- Middle Grey
- Exposure and different Program Modes

Human Sight Vs Camera Sensor

- The amount of light that a human eye can see is much broader than the amount of light that can be captured on film or digital sensors.
- If you were to assign numbers to the range of light which is visible to the human eye, you'd get a range that went from 1 (the darkest light you can see) to 16 (the brightest light).
- While your eye can see all this light at the same time, the camera can not. In fact, it can only capture 5 to 7 of those segments (or F-stops) in one image.
 - An F-stop is a standard value that allows half as much light through as the previous stop (or twice as much light as the next stop).

Aperture and Shutter Speed

- To capture a scene, the amount of light within the scene must be measured and the amount of light entering camera must be controlled.
- There are two camera settings which control the amount of light which enters the camera:
 - Aperture (F-stop control)

the size of the little hole that lets light through the lens



Shutter speed

how long the shutter remains open for the light to hit the film or sensor.

Metering and Exposure

- To determine the correct exposure (Aperture and Shutter Speed settings), the amount of light coming from the scene must be measured/metered.
- If the range of light measured between the brightest and darkest areas of the scene falls within the 5 to 7 stop capability of your sensor/film, you will capture detail in both the highlights and the shadows.
 - This should provide a technically accurate image.
- If the range of light measured exceeds the capability of your sensor, clipping will occur (detail is lost in highlights and lowlights).



Under exposed (not enough light)



OK Exposure



Over exposed (too much light)

Camera Meter Modes

- Most of today's SLR cameras are built with three metering methods:
 - Center-weighted
 - Evaluative
 - Spot metering
- Center-weighted:
 - The metering is weighted at the center and then averaged for the entire scene.
- Evaluative metering:
 - The scene is broken into several "zones". The camera identifies the lightest and darkest areas in each zone, and then computes an exposure (with the consideration of each zone).
- Spot metering:
 - This is for metering a specific part of the scene, usually 3-5%.

Middle Grey

Your camera sees everything in the scene as 18% middle grey and the exposure adapts accordingly.
Middle grey is perceptually about half way between black and white.



This is OK for the majority of scenes. However, when very dark or bright parts dominate a scene, the meter will be fooled by trying to render it as middle grey.

Exposure and different Program Modes

• P (program) Mode:

• Both the shutter speed and aperture are set automatically. The photographer can select the most appropriate Meter Mode.

• Av (aperture priority) Mode:

The photographer sets the desired aperture, and the camera sets the required shutter speed to make an accurate exposure. The photographer can select the most appropriate Meter Mode.

• Tv (shutter speed priority) Mode:

The photographer sets the desired shutter speed, and the camera sets the required aperture to make an accurate exposure. The photographer can select the most appropriate Meter Mode.

• M (manual exposure) Mode:

The photographer sets both aperture and shutter speeds to whatever he/she want.